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ABSTRACT

A 40-item questionnaire designed to investigate the variety and scope of developmental mathematics courses (DMC) offered at colleges and universities throughout the United States was administered to a selected sample of two- and four-year colleges in October 1974. The 104 respondents represented 21 states. Most (58%) of the colleges responding reported total student enrollments of 3,000 or less. Almost all the colleges (96%) expressed a need for DMC and offered developmental programs in English (86%), reading (89%), and mathematics (91%). Most of the colleges (70%) had had DMC for two to ten years and offered one (28%) or two (24%) different DMC courses. The areas covered were arithmetic (84%), elementary algebra (89%), geometry (35%), and trigonometry (34%). Most DMC classes (66%) were held in a regular classroom, but some (32%) used a math lab. The instructional methods used most frequently were lecture method (55%), programmed book instruction (54%), supplemental tutoring (37%), and work books or work sheets (29%). The principal grade awarded to students was the traditional letter grade. Regardless of the grading system used, most colleges (66%) offered some form of credit for DMC. Other results are reported, previous research studies in the field are reviewed, recommendations are made, and the survey instrument is appended. (DC)

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THE AMERICAN MATHEMATICAL ASSOCIATION
OF TWO-YEAR COLLEGES

SURVEY OF DEVELOPMENTAL MATHEMATICS COURSES AT COLLEGES IN THE UNITED STATES

SUBMITTED TO AMATYC
DEVELOPMENTAL MATHEMATICS
COMMITTEE OCTOBER 1975

BY CHAIRMAN OF
SURVEY SUBCOMMITTEE

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JC 760 363

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The chairman of the sub-committee responsible for this report would like to thank all those who participated in the development and completion of this study. Without the assistance from many individuals this project would not have been successful.

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INTRODUCTION

The purpose of this study is to report the results of a questionnaire administered to a selected sample of two-and four-colleges throughout the United States. This questionnaire was designed to study and investigate the variety and scope of developmental mathematics courses.

Within the last decade many institutions of higher education have changed significantly from educating the elite to educating the populous. For some selective colleges and universities this has meant the development of an open admissions policy of admitting all students who have earned a high school degree.

Colleges have always had some underprepared students. These students were handled through their adult education or general studies program until the students had completed the necessary prerequisites. Since the number of underprepared students was generally small, traditional methods of instruction were used, with little concern for the efficacy of those methods. Now that increasingly large percentages of freshmen classes need remediation, the "sweep the problems under the rug" attitude is no longer possible. The educators of today

recognize that these students were not academically oriented during their elementary and secondary school years, and that they bring with them a legacy of content deficiencies, poor study habits, bad self images, diffused goals and unsuccessful learning experiences.

Taking the lead in the instruction of these underprepared students have been the two-year college institutions. These community colleges, as most are called, tend to be more responsive to the needs of the general population.

HISTORY OF THE NATIONAL COMMITTEE

Many mathematics educators at the two-year colleges have felt a concern for the quality and success of instruction, particularly in remedial or developmental areas. A number of statewide associations of two-year college mathematics educators have been formed in the past few years, to serve as forums for the exchange of ideas and techniques, theories and applications in mathematics education. In April, 1974, at a national convention sponsored by the MATYC Journal, delegates took a further step toward improved communications at the two-year college level. This convention, established a permanent national study group concerned with the improvement of remedial-developmental mathematics--The National Committee on Developmental

Mathematics of the AMATYC (American Mathematics Association of Two-Year Colleges). Informal discussions among the many delegates assembled for the convention revealed the widely-held view that a nation-wide survey of the state of developmental (Remedial, preparatory) mathematics would be a good way to begin assessing the problem. A subcommittee, chaired by Prof. James Baldwin, prepared a questionnaire which was sent to colleges throughout the United States in October, 1974. An effort was made to send the questinnaire to members of the National Committee and to other faculty recommended by the Committee at specific colleges. The responses (104) were accumulated by January, 1975 and provided representation from 104 different colleges from 21 states.

PREVIOUS STUDIES

To establish a frame of reference for the study, it might be helpful to examine some of the previous research in the field.

In 1973, a survey of the remedial mathematics programs at the two-year colleges of the City University of New York was completed by Prof. Barbara A. Muir.[1] A questionnaire was administered to the chairperson or coordinators of remedial mathematics to determine the pedogogical

1. Muir, Barbara A., "A Survey of the Remedial Mathematics Programs at the Two-Year Colleges of the City University of New York." MATYC JOURNAL, Fall, 1973.

methods for teaching remedial math courses. (Remedial math was defined as courses teaching arithmetic and elementary algebra). She found that there was little uniformity among the eight units in approach and methods. There was variation in placement procedure: some units used standardized exams, all different; some used self-designed placements tests. Three methods of instruction were prevelant: classroom lecture-deomonstration, classroom programmed instruction and laboratory programmed instruction. Video-tapes and tutoring were used as supplements to the teaching procedures. A great diversity of textbooks was evident even when the same general teaching methods was used in different colleges. Four of the eight colleges did not offer credit for remedial courses.

The author raises the significant question as to whether the attrition rate is higher and the attendance lower when courses are not credited. She was also concerned with the lack of a systematic evaluation of the effectiveness of the various programs. The very diversity of the CUNY efforts seems to require a uniform yardstick of the comparison according to Prof. Muir. She advocates the establishment of regular communication among the units of CUNY regarding innovation and successes.

In Fall, 1974, the New York State Association of Two-Year Colleges through its Curriculum Committee, chaired by Dorothy Buerk, completed a survey of math programs for

underprepared students at two-year institutions of New York State.[2] All the colleges surveyed attempted to deal with new students who were underprepared for a variety of reasons. "Under-prepared" students were defined as those unable to do basic arithmetic and elementary algebra. The majority of the colleges used high school recores to determine which students required remediation, although some used intereviews, ACT or SAT scores. The estimates of the percent of underprepared students ranged from 10 to 50% in half the colleges surveyed, with the others being unsure of the numbers. Depending on the school, the remedial courses carried no credit, non-degree credit, degree credit or degree credit as an elective.

Instructional methods used were lecture-discussion, audio-visual, audio-tutorial, team teaching, CAI, supplemental peer tutoring, programmed instruction and laboratory assistance methods. Half the schools estimated that at least 60% of their remedial students go on to regular colleges courses. They all used regular math faculty who either chose, or were assigned to these classes. About one-third the schools offered counseling services for their remedial students. In the opinion of the interviewees, the students' major obstacles to learning math was their dislike of math, poor study habits and poor high school experience with math.

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2. Buerk, Dorothy, "Survey of Math Programs in Two-Year Colleges for underprepared students", NYSMATYC report.

About one-quarter of the respondents felt that their school's remedial programs were weak. Others felt that their program's greatest asset was the concern for students, and the provision which enabled students to progress in their skills at their own pace. Almost all of the respondents felt that knowing about other programs, talking with other faculty and getting new ideas would be of help to them in bettering their efforts.

In 1973, Prof. James Baldwin[3] completed a survey of remedial mathematics programs in New York State which investigated the relationship between the present status of remedial mathematics programs and the ideal remedial mathematics program, as perceived by chairpersons. A two-part questionnaire was administered to chairperson of each two-year college mathematics department in New York State. Questions relating to placement procedures, program facilities, grading methods, credit policies, tutoring facilities, educational background of remedial staff and general goals were asked in each section. Correlations between related questions were calculated.

Although only 38% of the schools used a placement examination, 71% of the chairpersons felt it ought to be used. On the other hand, there was agreement to grant credit for remedial courses, but not to assign these credits

3. Baldwin, James, "A Study of Remedial Mathematics in the Two-Year Community Colleges of New York State" - unpublished

to meet the college's mathematics requirement. There was a high correlation between the present and ideal status of the educational background of the instructors whose main responsibility was remedial mathematics. Most of the chairpersons felt that the current background of their staffs, at least an MA in mathematics or mathematics education was entirely suitable for staff qualifications.

Tutoring by student peers was and ideally should be the most popular way of handling tutoring. Although the most prevalent extra facility for remedial programs was programmed books, the ideal most favored was study laboratories and smaller classrooms. The type of grades administered were pass-fail or a variation thereof. A significant number of respondents who gave no credit for the remedial courses, indicated a desire to give elective credit, but such credit should not be used to fulfill mathematics requirements.

Most of the correlations were significant, indicating a contentment among the respondents. Prof. Baldwin points out that the chairperson completed the questionnaire and would be less apt to be critical of a program he/she was administering or might have originated. He suggests that an evaluation or comparison system should be devised to determine what aspects of remedial programs are successful.

There are other attempts at assessing the state of remedial mathematics which are presently in progress. For

example Prof. Pin Tung Chang of the University System of Georgia is in the process of evaluating his system's efforts. Prof. Karl Lindberg of Wayne State University is doing a national survey at the college level.

GOALS OF THE PRESENT STUDY

In light of the studies previously mentioned, it was felt that some basic issues needed to be investigated in regard to developmental mathematics on a country wide level With the information gathered and analyzed, the committee hopes to clarify some of the problems in this area, suggest some guideposts for further experimentation and serve as a clearinghouse for colleges throughout the country.

This study considered each of the following questions:

1. How many two year college in the United States recognize the need for Developmental Mathematics Courses (DMC)?
2. What areas are taught in the DMC?
3. What department administers the DMC?
4. How are the students chosen for the DMC?
5. Is the DMC required of all students found to be mathematically deficient and must they successfully complete it before going on?
6. What diagnostic procedures are used in the DMC?
7. What is the physical setting of the DMC?
8. What is the learning pace?
9. What are the primary instructional methods?
10. What instructional aids are available for DMC?
11. What is the grading system for the DMC?
12. What is the credit system?
13. What textbooks are used and what home-made materials?
14. What staff is involved in the DMC (instructors, tutors, clerical and counseling) and how are they assigned?

15. How many students enrolled in the DMC go on to other college mathematics courses and how many successfully complete this next one?

16. What formal evaluation of the DMC has been done by the school?

17. What are the strengths of the DMC and how does the school feel it should be improved?

For each fixed alternative question, the percentage of respondents choosing a response was given.

In the appendix, all responses to open-ended questions and any additional information which was sent by the respondents, is summarized.

RESULTS

Indicated below is each question and the percentage of respondents who indicated a particular fixed alternative choice. Those questions not included below were open-ended questions and the complete results from these appear in the appendix.

1. How many full time students attend your college during a regular semester or quarter?

Between 0 and 1000	19%
Between 1001 and 3000	39%
Between 3001 and 5000	18%
Over 5001	21%
No Response	3%

*2. What areas of instruction offer developmental programs at your college?

English	86%
Reading	89%
Mathematics	91%
Other	24%

3. Approximately what percentage of your students must enroll in developmental programs in more than one area of instruction?

0- 20%	57%
21- 40%	15%
41- 60%	10%
61- 80%	4%
81-100%	1%
No Response	13%

*more than one response was given by some respondent

4. Is there a need for DMC at your college?

Yes	96%
No	2%
No Response	2%

5. Do you have a DMC?

Yes	91%
No	5%
	3%
No Response	1%

6. For how many years has your college had a DMC?

Less than 2 years	7%
2-5 years	31%
5-10 years	39%
More than 10 years	15%
No Response	8%

*7. What areas of mathematics are taught in your DMC?

Arithmatic	84%
Elementary Algebra	89%
Geometry	35%
Trigonometry	34%
Other	29%

8. How many different DMC do you offer?

One	28%
Two	24%
Three	12%
Four	12%
Five	14%
No Response	10%

9. What percentage of your full time students are enrolled in DMC?

0- 20%	64%
21- 40%	17%
41- 60%	7%
61- 80%	3%
81-100%	0
No Response	9%

10. What percentage of your part time students are enrolled in DMC?

0- 20%	69%
21- 40%	10%
41- 60%	8%
61- 80%	0
81-100%	0
No Response	13%

11. What department administers DMC?

Mathematics with input college wide committee	8%
Mathematics Department	64%
Developmental Studies	16%
Other	5%
No Response	7%

*12. How students chosen for the DMC?

Commercial Standarized Placement Test	19%
Department Placement Test that was validated	14%
Department Placement Test	28%
High School Grades in all courses	15%
High School Grades in Mathematics	53%

Scholastic Aptitude Test	16%
American College Testing Scores	23%
Interview	45%
Teacher Referral	44%
Performance in selected courses	20%
Volunteer	53%
Other	17%

*13. Are DMC required of all students determined to be mathematically deficient?

Yes	4%
No, it depends on students' major	15%
No, no one is required but strongly suggested	29%
No	45%
No Response	7%

*14. How many mathematics courses are required of liberal arts and humanities students after completion of DMC?

Zero	37%
One	36%
Two	17%
Three	6%
More Than Three	0
No Response	4%

15. Prior to enrolling in other college mathematics courses, must the DMC be passed successfully by those students enrolled in it?

Yes	52%
Yes, if the student has a science or technology major	5%

No, students may enroll concurrently in other math courses	31%
Other	1%
No Response	12%

*16. Once a student is placed in DMC what diagnostic procedures are used?

Student must complete all topics in DMC	47%
Placement exam is used to diagnosis	22%
Pre-test at the beginning of each topic is used to diagnosis	27%
No Response	2%

17. Does the required content of the DMC differ for each student, depending on the students major course of study?

Yes	32%
No	58%
Other	9%
No Response	1%

*18. Where do students enrolled in DMC report for instruction?

Regular classrooms	66%
Math lab on assigned days	32%
Math lab on any day student chooses	23%
Other	9%
No Response	0

*19. Does the student set his/her own pace for learning?

Yes, entirely up to student	26%
Yes, with certain constraints imposed by the program	51%
No	23%
No Response	0

*20. From the instructional methods listed below choose those that best describe your DMC.

Lecture Method	55%
Discussion Groups	11%
Emphasis on Audio Visual Aids	11%
Audio Tutorial Method	24%
Team Teaching	4%
Extensive Tutoring	20%
Supplemental Tutoring	37%
Computer Assisted Instruction	4%
Programmed Books Instruction	54%
Keller Plan	13%
Group Work	8%
Work Books or Work Sheets	29%
Open Book Examinations	1%
Small Classes	26%
Individual Attention	44%
Open Laboratories	26%
A comprehensive development program for many other areas of instruction as well as mathematics.	5%

*21. Does your college have any of the following facilities specifically for DMC?

Movies	14%
Slides	30%
Audio Tapes	57%
Electronic Calculators for use in DMC	26%
Mathematical Gadgets	6%

	Mathematical Games	4%
	Computer use in DMC	8%
	Specific library for DMC	10%
	Laboratories for DMC	37%
*22.	What type of grades are given in the DMC?	
	Letter	66%
	Numerical	3%
	Pass - Fail	14%
	Incomplete	14%
	Pass no credit	8%
	Pass partial credit	2%
	Some variation of pass incomplete	14%
	Student's choice	1%
	Written statements	1%
23.	Is there credit give for DMC?	
	Yes, but not to meet mathematics degree requirement	30%
	Yes	36%
	No	17%
	No Response	17%
24. and 25. are open ended questions		
*26.	How are instructors assigned to DMC?	
	Instructors are hired specifically for DMC	15%
	Instructors volunteer	14%
	Instructors rotate	33%
	No Response	27%

27. What is the approximate faculty/student ratio for DMC?

Between 1-1 and 1-5	0
Between 1-5 and 1-10	4%
Between 1-10 and 1-20	34%
Between 1-20 and 1-30	35%
Between 1-30 and 1-40	9%
Over 1-40	0
No Response	18%

28. Do you specifically assign any para-professional or secretaries to assist instructors with the record keeping involved with DMC?

Yes	39%
No	53%
No Response	8%

*29. Do you hire tutors to assist instructors?

Yes, 2 year college students	43%
Yes, 4 year college students	8%
Yes, graduate students	6%
Yes	5%
No	39%
No Response	14%

30. If the DMC is administered by the Mathematics Department, is one person other than the department chairman in charge of the program?

Yes	33%
No	48%
No Response	1%
Other	18%

31. If your response to question 30 is yes, than is this person given release time?

Yes	15%
No	23%
No Response	62%

*32. Are there counselors available for students enrolled in DMC?

Yes, there are counselors specifically for students enrolled in DMC	13%
Yes, we may refer students to college counselors	66%
Yes, but only for placement	5%
No	13%
No Response	4%

33. Approximately what percentage of the students enrolled in DMC go on to other college mathematics courses?

81-100%	9%
61-80	16%
41-60	14%
21-40	19%
0-20	5%
I do not know	37%

34. What percentage of the students enrolled in DMC successfully complete their next mathematics course?

81-100%	6%
61-80	17%
41-60	12%
21-40	14%
0-20	4%
I do not know	47%

35. What percentage of the students who enrolled in DMC have gone on to complete the first two years of college?

81-100%	2%
61-80	11%
41-60	10%
21-40	8%
0-20	5%
I do not know	64%

*36. Which of the following do you believe are the greatest strengths of your DMC?

Concern for students	72%
Small class sizes	28%
Programmed material	23%
Students self paced	44%
Peer tutoring	23%
Giving credit for DMC	22%
Testing only for mastery	13%
Students are not isolated in special classes	9%
Modula system	9%
Other	4%

37. Has there ever been any formal evaluation of your DMC?

Yes	14%
No	72%
No Response	14%

38. Are you satisfied with your DMC?

Yes	42%
Yes, but it should be improved	41%
No, and it should be dropped as a course offering	1%
Undecided	4%
No Response	12%

39. and 40. are open ended responses.

DISCUSSION OF RESULTS

The majority (58%) of colleges responding had between 0 and 3000 students enrolled. Almost all the colleges (96%) expressed a need for DMC and offered developmental programs in English (86%), Reading (89%), and Mathematics (91%).

Most of the colleges (70%) have had DMC for 2 - 10 years and offer one (28%) or two (24%) different DMC courses. The areas covered are arithmetic (84%), elementary algebra (89%), geometry (35%), and trigonometry (34%). Only a small percentage (0 - 20%) of full and part time students at over sixty percent of the colleges are enrolled in DMC.

The mathematic department is the principal agent administering DMC in the majority of colleges (64%). The most popular methods used to choose students for DMC were high school grades in mathematics (53%), interviews (45%), teacher referral (44%), and student volunteering (53%).

Very few colleges (4%) actually required enrollment in DMC if a student was found to be mathematically deficient. Many colleges stronly suggested it (29%) or said it depends on the student's major (15%). However, if a student was enrolled in DMC he was required to pass it successfully in most colleges (52%) and usually (36%) enroll in one course after completion of DMC. Many colleges (37%) do not require any

course after DMC is complete.

Some college (22%) used placement exams for diagnosis procedures, others (27%) used a pretest at the beginning of each unit, but most (47%) required students to complete all topics.

Most classes (66%) of DMC were held in regular classrooms, however, some (32%) used a math lab.

The instructional methods used most frequently were lecture method (55%), programmed book instruction (54%), supplemental tutoring (37%), and work books or work sheets (29%). The facilities used most frequently were audio tapes (57%), laboratories (37%) and slides (30%).

The principal grade awarded to students was the traditional letter grade (66%). Some colleges did offer pass-fail or pass-incomplete or some variation of the pass - fail-incomplete option. Regardless of the type grade, most college (66%) offered some form of credit for DMC.

The size of the DMC is close to the traditional class-size with a student faculty ratio of between 10-1 to 30-1.

Very few (39%) colleges used paraprofessional or secretaries to assist in DMC, however, many (43%) used two year college students as tutors.

Release time was very seldom (15%) given to the faculty responsible for administering DMC. Also, very few college (13%) offered counseling services specifically for DMC.

Approximately a quarter of the colleges stated that

students enrolled in DMC go onto other college mathematic courses and successfully complete their next mathematics course. However, on all the question involving some sort of evaluation of the success of the program the overwhelming response was "I don't know". This lack of evaluation was reflected again in the question as to whether there was ever any formal evaluation of their program. The overwhelming response (72%) was "No".

When asked to choose the greatest strength of the DMC in the respondents college the responses were: concern for students (72%), student self paced (44%), small class sizes (28%), programmed material (23%), and peer tutoring (23%).

When asked if the respondent were satisfied with their DMC, approximately forty percent stated they were. An equal number stated that they desired some improvement.

CONCLUSIONS

1. DMC has existed at most colleges for over two years.
2. There is a definite need for developmental mathematic programs.
3. The major areas studied by students were arithmetic and elementary algebra.
4. At most colleges the percentage of students involved with DMC was less than 20%.
5. The mathematics department principally administered DMC.
6. High school math grades was the principal predictor used for DMC.
7. Most colleges cannot or do not require DMC, however, once a student enrolled in DMC, the student must pass the DMC.
8. Most colleges require students to complete all topic of DMC regardless of major.
9. The principal room used for DMC were regular classrooms.
10. Most programs allowed for some student self-paced learning.
11. The most popular instructional method was lecture and programmed books.
12. The most popular facility was audio tape.
13. Traditional letter grades were used to evaluate students.
14. There usually was some form of credit given for DMC.
15. Instructors were usually assigned to DMC, rather than volunteering or being hired specifically for DMC.
16. Very few colleges used paraprofessionals or secretaries to assist in DMC.
17. Tutoring by other two-year college students was very popular.
18. If an individual other than the math department chairmen administered the DMC, he did not usually receive release time.

19. Very few colleges used councelors specifically for DMC.

20. Evaluation for existing programs was just about non-existent.

21. Many colleges would like to improve their DMC.

RECOMMENDATIONS

1. Remedial - Development Programs should continue to emphasize arithmetic and elementary algebra.

2. More cooperation with other departments should be instituted in order to educate the total student.

3. Placement procedures should be expanded to include more than just high school math grades and should include placement tests.

4. DMC should be required for all mathematically deficient students. However, students should be required to complete only those topics he/she needs.

5. Self-paced instruction should be controlled; it may be necessary to set guidelines so the student does not put off math for other more pressing (paced) courses.

6. Audio visual material should be used.

7. An alternative grading system should be considered.

8. Regular college credit for DMC should be granted.

9. Paraprofessionals should be used for record keeping so as to free instructors for small group instruction.

10. Tutoring should continue to be handled by two-year college student peers.

11. Release time for administrators of DMC should be granted.

12. Formal evaluation of programs should be performed.

13. A training program for instructors of DMC; i.e. teacher training for DMC should be instituted.

RECOMMENATIONS, cont.

14. An advisory committee should be formed to provide input to other colleges as to how to bring new innovations into their DMC.

15. An advisory committee should be formed to provide input to other colleges as to how to perform the best evaluations of their own programs.

RESPONSES INDICATED AS "OTHER"

Question 2 What areas offer developmental programs?

1. Science Laboratory
2. Chemistry
3. Writing
4. Growth and development (psychology)
5. Study Skills Course
6. Biology
7. Speech
8. Social Science
9. English
10. Reading

Question 7 What areas of mathematics are taught in DMC?

1. Slide Rule
2. Metric System
3. Desk Calculator
4. Logarithm
5. Basic Statistics
6. Probability
7. Technical Algebra
8. Technical Trigonometry
9. Intermediate Algebra
10. Any math a person is interested in taking.

Question 12 How are students chosen for DMC?

1. Recruited by preparedness program for disadvantaged students
2. Can only "advise" a student to take a course
3. Counseling and administrative referral
4. Comparative guidance and placement test
5. Combination of many above
6. Departmental screening examination administered in Introductory College Math I. On basis of their achievement on this test, some students are advised to take DMC.

Question 15 Must DMC be passed prior to enrolling in another math course?

No, but DMC must be passed by end of following semester.

Question 17 Does the required content of DMC differ for each student:

No, not right now, however we are moving in that direction.

Question 18 Where do students report for instruction?

Learning Resource Center.

Question 30 Is your DMC administered by one person other than your department chairman?

Basic Studies department administers program.

(continued)

Question 36 What do you believe are your greatest strengths in your DMC?

1. Individualized program for each student.
2. Two methods of instruction.
3. Flexibility of program.
4. Carrying out remediation with topics unfamiliar to the student (such as statistics)
5. Integrated approach with many departments.
6. Individualized tutoring.
7. Concern for students.
8. Small class size.

Responses to Question 24 & 25

Questions 24-25 What instructional material do you use in DMC?

Code	Response	
1	Elementary Algebra	
2	Computational Arithmetic	by Puppin
	Elementary Algebra	by Ashley and Harvey
	Elementary Geometry	by Zlot
	Trigonometry	by Davis
	Intermediate Algebra	by Ashley and Harvey
4	Audio Tutorial Tapes	published by Merrill Publishing Co.
5	Series of Keedy and Bittenger	Adison Wesley
6	Workbook by Respondent	
7	College Arithmetic	by Preis and Cochel
	Algebra Text: Elementary	by Alwin Hackwork Howland
	Algebra Programmed	by Alwin Hackwork Howland
	Intermediate Algebra	by Wooton and Drooyan
8	Core Mathematics	published by Worth Co..
	Algebra 1, 2, 3, 4	by Allwin, Hackworth Howland
9	Basic Arithmetic Skills	by Gossage
	Intermediate Algebra	by Wooton and Drooyan
	Elementary Algebra	by Wooton and Drooyan
	Advanced Algebra	by McHale and Witzki
10	Working with Numbers, a Refresher Course	by Shea
	Basic Algebra for College Students	
11	Algebra books	by Wooton and Drooyan
	Arithmetic for Self Study	by Mangan
13	Basic Algebra	by McHale and Witzke
	Intermediate Algebra	by McHale and Witzke
15	Basic Mathematics	by Gossage
	Elementary Algebra	by Russell and Collins
	Intermediate Algebra	by Russell and Lanncy
	College Geometry	by Hennerling
	Plane Trigonometry with Table	by Fuller
	Success in Mathematics	by Motivation Development Inc.
	Algebra - Programmed 1 - 4	Alwin and et al
	Programmed Geometry	F. Greene
	Programmed Trigonometry	T. Davis
16	Basic Algebra	by McHale and Witzke
	Modulo Mathematics	by CUNY

Code	Response
17	Arithmetic by Erant Programmed Algebra by Alwin et al Applied Technical Mathematics by Moon & Davis Intermediate Algebra by Newmeyer and Klentos
37	Beginning Algebra by Munen and Tricherlast
38	Introductory Algebra by Keedy and Bittenger Arithmetic: Semi-Programmed by Williams
41	Introductory Algebra by Keedy and Bittenger Arithmetic by Keedy and Bittenger Geometry by Ashley and Harvey Trigonometry with College Algebra by Fuller
42	Algebra by Alwin, et al
43	Success in Math by Glenn-Motivation Development
44	Intermediate Algebra by Newmeyer et al lementary Algebra by Moon & Davis
45	Arithmetic by Namney and Schaffer Practical Arithmetic by Flemming and Hepburn
46	Arithmetic for College Students by Wright Algebra by Keedy and Bittenger
47	If it is on the market then we use it
48	Algebra for College Students by Johnson, Fenelsy, Sternick Foundations for College Geometry by Hannerty
49	Introduction to Algebra by Keedy and Bittenger Geometry: A Guided Inquiry by Stein Essential Math by Keedy and Bittenger
50	Beginning Math for College Student Mathematics through Statistics
51	Basic Math - Audio Tutorial Approach by J. Burris Beginning Algebra by Munen et al Intermediate Algebra by Wooton and Drooyan
53	Basic Math by Zeller and Zant Elementary Algebra for College Student by Wright and Lindgren

Code	Response
54	Arithmetic by Keedy and Bittenger Elementary Algebra by Keedy and Bittenger Intermediate Algebra by Keedy and Bittenger
55	Elements of Arithmetic, Algebra and Geometry by Fornan
56	Basic Arithmetic by Moon, Koncad, Klantos, Newmeyer Elementary Algebra by Wooton and Drooyan Intermediate Algebra by Wooton and Drooyan
59	Elementary Math by Alwin et al
60	Elementary Algebra by Wooton and Drooyan
61	Fundamental of Arithmetic by Eraut Fundamental of Elementary Algebra by Eraut Fundamental of Intermediate Algebra by Eraut
62	Series published by Merrill Publishing Co.
63	Working with Numbers by Shea
64	MATC series by McHale and Witzke Arithmetic by Ries
65	Algebra: Programmed by Alwin et al
66	Introduction to Algebra by Drooyan and Wooton
67	Developmental Arithmetic by Carl
68	Arithmetic and Algebra by Benice Arithmetic, Skills and Problem Solving by Conway and Dreyfus
70	Basic Arithmetic by Moon, Konrad et al
71	Essentials of Arithmetic by Johnson and Willis Intermediate Algebra Keedy and Bittenger
72	Elementary Algebra for College Students by Bear and Mouck Essential Arithmetic by Johnston and Willis
73	Elementary Algebra by Moon and Davis Intermediate Algebra by Newmeyer and Kluton
75	Elementary Algebra by Stein
76	Essential Mathematics by Stockton Elementary College Arithmetic by Ledbitter
77	Tape Series by Merrill Publishing Co.
78	Geometry by Adams

Code	Response
79	Arithmetic: 1st program in math by Heywood Algebra: Basic Algebra land 2 by Selby and Fredrick Intermediate Algebra by Keller
80	Series by Merrill Publishing Co.
82	Arithmetic through Pre Calculus by Neumen and Yizze
84	Series by Merrill Publishing Co.
85	Basic Math for College Students by Stein Preparatory Freshman Math by Sagar and Wisthoff
86	Arithmetic by Keedy and Bittenger Elementary Algebra by Keedy and Bittenger
88	Arithmetic by Preis and Locks Algebra: Programmed by Alwin, et al Elementary Algebra by Drooyan and Wooton
90	Basic Algebra by McHale and Witzke
92	Algebra: Programmed by Alwin, et al Elementary Geometry by Zlot Analytic Trigonometry by Howes
94	Introduction to Algebra by Keedy and Bittenger
96	Elementary Algebra by Keller and ant
99	Arithmetic by Nanney and Schaffer MATC Math Series by McHale and Witzke
102	Basic Math Series published by Merrill Publishing Co.

RESPONSES TO QUESTION 39

39. How would you improve your DMC?

Code	Response
2	More Audio tutorial materials and less students/section.
3	More Audio Visual materials - some calculators.
4	Smaller class size.
6	Complete material; use of calculators for specified units; paraprofessional use.
8	By offering alternative modes of instruction, specifically scheduled lectures, and small group discussions.
11	Go to individualized instruction.
13	More 1 - 1 tutoring.
15	More individualized learning packages developed by the department--more objective testing.
16	Better facilities--AV type. More individualized instruction.
17	More research on accomplishments.
18	Offer students other options such as closed circuit T.V. monitors, whole course on cassette tapes.
19	Give the option of taking it on a computer assisted basis; e.g. Plato at Univ. of ILL.
20	Employ Audio-Titorial methods available. Self-paced through Keller Plan (tried successfully but opposed and dropped by the department for various reasons).
21	It should be required of some students and not voluntary.
23	Rewrite some of the material, make better use of lab, paraprofessional, and student tutors. It's a little early to get more of an idea.
27	Smaller student-instructor ratio. Would like para-professional help with clerical work.
28	Perhaps indroduce more of a self-paced character to the course.
30	Keller Plan approach, with coordinator, lab, and tutoring assistance, using a pretest and follow up study on the validity of the exam.
32	We would like to offer more alternatives, expecially to those with reading problems. We are thinking of buying or making video-tapes which students could use in an open lab. We plan to hire para- professionals to assist the instructor. We may teach a course in a laboratory situation where we would use manipulative materials--pattern and fraction blocks, bundling sticks, counters, hand calculator, tangram puzzle, road maps and map measure, meter sticks and scales. We may use the Computational Skills Development Kit from SRA for drill and diagnosis.

Code	Response
33	It is primarily a fundamental algebra course and I'm convinced that more appropriate subject matter could be found for the typical student who is a non-science, terminal student that will not go to a senior institution.
34	Add more equipment; smaller student to teacher ratio; small (4 to 5) discussion groups; larger library of alternate material.
36	Need better text - more tutorial assistance.
37	Administratively it needs improvement. Tutors and paraprofessionals have not been hired in the amount of quality that funds are available for. The present instructors must give their time as lab assistants because there are none (or not qualified) to handle lab.
41	Change the programmed courses to lecture drill courses.
42	Develop with section.
47	I would self pace next mandated DMC course so students could continue with it even in mid semester. I would (and will) improve material in algebra.
48	More audio-visual tutorial aide at spots which have proven to be especially difficult problem areas for a number of students.
49	Reduce class size, in house proved video tapes.
50	We need to obtain develop better text material to individualize instruction more.
51	Provide more review modules with appropriate pre & post test.
52	We will continue to improve by offering some individualized instructors option to regular course assignment.
54	Group discussions and mini-lectures over certain topics, currently difficult to arrange.
56	Greater flexibility, greater adaptablility to student needs.
58	I would like a functional lab and more help and all would be okay. There is too much to do.
59	Emphasis on mastery learning; coordination with other developmental courses in the first semester.
60	Need to deal more with the fear of Math and creative Math activities. Need to deal better with individual pacing without isolating.
61	Give it credit, offer it both as lecture and IPI, student given option to choose between pass-fail or letter grades, have access to larger lending library, more facilitors, instructional materials needs improvement, issue grade of incomplete for students who do not attain all the required objectives, teach mini-courses that help students understand math concepts specifically related to other courses; i.e., refreshers.

Code	Response
63	Need released time to complete preparation and continue revision of materials constructed to enable students to succeed more satisfactorially by using material adapted to needs and pace of learning.
68	More students who begin the program should successfully complete it. The introduction of the self-paced approach has decreased the attrition, but further improvement should be sought. The program must be continually examined in the effort to improve it.
62	Follow-through and comparison of our lecture and audio-tutorial self-paced sections should be done.
70	More individualization.
71	Administration is not aware of the problem of the disadvantaged. Recommend they read "A Modest Proposal" by Dr. W. Moore.
72	Move to more individualized self-pacing approach using a variety of material and techniques.
73	Like to offer mini courses but need adequate staff and workable schedules. Also offer advanced courses (Col. Alg., Trig., Cal.) in math lab.
75	Use more proctors. Reduce the student teacher ratio. Use topics directed to specific fields of interest.
76	Not set up for arithmetic, too few students require this type of instruction. Those who don't like audio tutorial method are also a problem. As of now the student is not overworked.
77	A. Improve content B. Refine in some areas C. Use better qualified personnel D. Give students more learning alternatives
78	More care to individual needs.
79	Hope to be able to adapt course content in some DMC courses to specific student major area. Wish to eliminate procrastination so common in programmed courses.
80	A. More personnel B. Larger budget c. More contact with high schools
81.	Develop C or I followed by research then redevelopment based on factual data.
82	A. Get more faculty involved B. Produce more short topics, slides and audio

Code	Response
83	Better diagnostic testing, more individual attention, more use of AV materials followup.
84	Use computer for testing purpose.
85	Starting a skills center headed by a coordinator that is funded by grants or school (which they are not willing to do).
86	More individual help--concern for progress nor non-progress.
86	Continually developing new material, tests, and searching for better texts.
88	Perhaps greater emphasis on decision making and problem solving with lesson skills.
90	Increase variation on offerings should include units on metric system, statistics, geometry.
91	Increased staffing, both instructors and student aids; improved counceling; expanded publicity; would employ lab expert and hand calculators as a learning device to a greater extent that we have done. We need more visual aids and a better textbook--possibly even a second semester course.
94	Do more to spot remediation for science students.
95	Additional help in how to set up courses, how to motivate students, more open lab facilities for student use.
96	Different text--more use of media.
99	1. More audio visual aids 2. More competent tutors 3. Fewer students/class 4. More assistance from administration
100	Develop more programs--utilize new material as they become available--develop new testing programs--develop some of our own material if time and money become available.
101	By establishing a separate staff to teach the DMC. A staff trained to handle this specific responsibility.
102	A lab setting should be used with students having access to audio visual aids; paraprofessionals and tutors should be employed.
103	Provide more options. We now have two: lecture instruction--paced and student paced programs. More materials--audio oriented, etc.
104	We should go towards more small modular courses--strongly assisted by tutors.

RESPONSES TO QUESTION 40

40. Additional Comments

Code	Response
20	There should be considerable improvement during the next year. The college will have a new academic building and the Math Dept. will have a mathematics laboratory equipped with Audio-Visual carrels for the students. It is anticipated that there will be greater use of a self-paced basic remedial course.
26	We do not have a DMC as such. However, we do have a Learning Center. Superior math students act as tutors to those students (approx. 30%) who are referred by instructors. The Learning Center has quite a bit of A-V material for these math students. Students can get the math tutors on an appointment basis. In the past, some instructors volunteered to counsel students, but not many students have availed themselves of this opportunity. We are working on methods to improve the service at the Learning Center.
30	The faculty have questioned the effectiveness of our program 1. Attrition rate? 2. Purpose of program? filling quotas or offering a service? 3. No long range plans for an FOP program.
78	We offer traditional course which they must pass to proceed by Department tests. If they are not successful they withdraw from the pace. There are no technical courses here for them to try.
82	Math center handles the DMC. Help in required courses and Math club.
85	Please be aware of what I think to be a good and successful program at Wastanauh C.C. in Michigan.
54	Self-paced programs require students discipline which often times is lacking. This shows in the large numbers who earn incompletes for the quarter. The lack of group discussions which one can encourage in a "lecture" class is non-existent in programmed learning. This we consider a handicap to intellectual growth and motivation to continue the study of mathematics outside of DMC.
62	Would like the results of your subsequent analysis and compilation.
55	We are in the process of establishing a developmental skills program on campus, and hopefully will be able to do more with students having arithmetic problems than we have in the past. We have been experimenting with our basis mathematics (elementary algebra) course as to the most effective teaching method; lecture; PSI (Keller Plan); small group; and are very interested in what is working on other campuses.
42	Would like a copy of final report.
43	I am interested in films being used in other DMC.

Code	Response
44	Our math lab is in its fifth year, it originally had all the gimmicks such as: student-teacher contracts, variable credits, diagnostic exams, pretests and post tests and an abundance of audio material. Each year we have become a bit more traditional. We now require attendance at lectures exception for superior students, we don't use contracts, place little emphasis on the audio material. (If the student has reading problems we send to the reading clinic). We have retained the student tutors, individual exams & open laboratory. If a student wants to proceed faster than the pace of the lectures he is free to do so. A few outstanding students have finished a quarter's work in three weeks. Basically we have learned that in general the type of student taking a DMC does not have the self discipline (with respect to mathematics) to handle independent study in mathematics.
45	Our arithmetic is going beautifully, with about 1200 students/ year. Our pre-calculus is going well, with about 300 students a year, better prepared, and motivated than those in arithmetic. We have a gap in elementary algebra which we are now preparing to fill.
50	We are planning to expand our use of computer assisted instruction to provide drill and practice in fundamentals for all sections of DMC. Currently we offer this to only a few sections.
102	Students should be tested by Diagnostic Test. Then each student results should be analyzed and they should then be placed according to their math needs.
92	To my way of thinking, the wrong questions are being asked: 1. What <u>is</u> a college course in mathematics? 2. How do you cope with DMC courses in which attitude range from 0 to 99 on a scale of 100? 3. How do you a-ply these questions to a small, liberal arts college with 300 students--with 1 instructor in math and--part-time assistant instructor?
91	Many students entering technical programs have need of our services but usually enroll in the tech math sequence with an inadequate foundation. It is difficult to coordinate our activities with those in the tech curricular who prefer to do it their way. The demand for DMC is clearly evident on our campus, but not only DMC students desire alternatives to traditional classroom lectures. I think we have to take a long hard look at different modes in instruction, throughout the curriculum. How do you measure motivation? And how can you convince a student who has been conditioned to failure in his experiences with math, that he needs certain skills regardless of his major? We offer variable credit (1-4) in arithmetic intend to do same with basic algebra.

Code	Response
88	In our DMC, all students begin with an arithmetic diagnostic test to determine which arithmetic topics, if any, they must cover before proceeding to the next part of the course. Since our DMC is designed to prepare students for one of 4 specific math courses, after they complete any necessary arithmetic review they must choose which of the two math branches of the course they wish to pursue--the modern math branch as preparation for Fundamentals of Math I or Fundamentals of Math II or the algebra branch as prepartation for college Algebra or Tech Math I. Our DMC classes are heterogenously grouped, with students from both branches of the course in the lab at the same time. Also the math department offers applied math, which is programmed and modularized to cover Auto Tech, Fire Tech, Machine Tech and Environmental Studies. This is run in the math skills lab concurrently with our DMC. Our DMC algebra students have choices of lecture or lab classes. Within the lab they may choose either printed programmed instructions or audio cassette tape with a work text. Unfortunately, while many of the topics are similar in the lecture text, they are by 3 different authors and therefore are not completely interchangable.
48	Putting everything under DMC is difficult for us. We have developed a specific program for very basic mathematics on a modular system. There are 5 modules: whole arithmetic, Fractions, Decimals, Intro to Algebra, Introduction to Geometry, each worth 1 semester hour institutional credit. A student may enroll for 1, 2, or 3 hours initially and is placed in the appropriate modules through placement exam and conference. The material is self-paced. One year successful completion of a module (70 or better on 3 or 4 tests) he receives 1 hour credit. Enrollment is open any time up to the 12th week of the semester. We are currently running 1 day section (21 enrolled) and 1 night section (27 enrolled). Elementary Algebra & Elementary Geometry are taught as a traditional pattern as 5 and 3 semester have courses respectively. Intermediate Algebra is also offered as a separate 3 semester course but information for it was not included in these responses.

STUDY OF DEVELOPMENTAL MATHEMATICS
COURSES AT COLLEGES IN THE UNITED STATES

At the first meeting of the National Committee on Developmental Mathematics of the National Mathematics Association of Two-Year College Educators (NATMATYC), a subcommittee was formed and charged with the responsibility of studying present Developmental Mathematics Courses (DMC). The following questionnaire is the beginning of this subcommittees' endeavors. To make this study a success, your cooperation is needed. Please respond to all questions as honestly as you can.

For the purpose of this study Developmental Mathematics Course (DMC) shall mean those Mathematics courses usually taught in high school to prepare students for college. Other words for Developmental Mathematics are Remedial Mathematics, Basic Mathematics, and Preparatory Mathematics.

A. Respondent Information:

Directions: Please use the space provided to indicate the desired information.

Name of respondent _____

College _____ ○ Four Year College
○ Two Year College

Location: City_____ State_____ Zip Code_____

Date_____

B. Background Information on Your College:

Directions: Please check the appropriate response(s).

1. How many full time students attend your college during a regular semester or quarter?

_____Less than 500

_____Between 500 and 1,000

_____Between 1,000 and 3,000

_____Between 3,000 and 5,000

_____Between 5,000 and 10,000

_____Over 10,000

2. At your college what areas of instruction offer developmental programs?

___ English
___ Reading
___ Mathematics
___ Other (please specify)_____

3. Approximately, what percentage of your students must enroll in development programs in more than one area of instruction?

_____ 0-20%

_____ 20-40%

_____ 40-60%

_____ 60-80%

_____ 80-100%

4. Is there a need for a DMC at your college?

_____ Yes

_____ No

5. Do you have a DMC ?

_____ Yes

_____ No

If your response to question 5 is yes please continue answering all the questions. If your response is no there is no need to continue answering the questions below.

6. For how many years, has your college had a DMC?

_____ less than 2 years

_____ 2-5 years

_____ 5-10 years

_____ more than 10 years

7. What ares of mathematics are taught in your DMC?

_____ Arithmetic

_____ Elementary Algebra

_____ Geometry

_____ Trigonometry

_____ Other (please specify) _____

8. Some colleges offer the topics indicated in question 7 in one DMC. Other colleges prefer to separate the different topics into distinct courses (i.e. one course of elementary algebra, another for geometry etc.). How many different DMC do you offer? (If possible please attach a brief course description for each course)

_____ One

_____ Two

_____ Three

_____ Four

_____ Five

9. What percentage of your full time students are enrolled in DMC?

_____ 0-20%
_____ 20-40%
_____ 40-60%
_____ 60-80%
_____ 80-100%

10. What percentage of your part time students are enrolled in DMC?

_____ 0-20%
_____ 20-40%
_____ 40-60%
_____ 60-80%
_____ 80-100%

11. What department administers DMC?

_____ Mathematics department with input from college wide Developmental Committee
_____ Mathematics department
_____ Developmental studies department
_____ Other (please specify)

C. Placement and Related Matters

12. How are students chosen for the DMC?

_____ Commercial Standardized Placement Examination
_____ Departmental Placement Examination that was validated and checked for Reliability
_____ Departmental Placement Examination
_____ High School Grades in all courses
_____ High School Grades in Mathematics
_____ Scholastic Aptitude Test Score (SAT)
_____ American College Testing Scores (ACT)
_____ Interview
_____ Teacher Referral
_____ Performance in selected courses
_____ Volunteer
_____ Other (please specify)_____

13. Are DMC required of all students determined to be mathematically deficient?

_____Yes

_____No, it depends on the students' major

_____No, no one is required, but the student is strongly suggested to enroll

_____No

14. How many mathematics courses are required of liberal arts and humanities students after completion of DMC?

_____Zero

_____One

_____Two

_____Three

_____More than three

15. Prior to enrolling in other college mathematics courses, must the DMC be passed successfully by those students enrolled in it?

_____Yes

_____Yes, if the student has a science or technology major

_____No, student may enroll concurrently in other mathematics courses

16. Once a student is placed in DMC what diagnostic procedures are used?

____Student must complete all topics in DMC

____Placement examination is used to diagnosis

____Pre test at the beginning of each topic is used to diagnosis

17. Does the required content of the DMC differ for each student, depending on the students major course of study?

____yes

____no

D. Pedagogy Questions:

18. Where do students enrolled in DMC report for instruction?

____ Regular classrooms

____ Mathematics laboratory on assigned days

____ Mathematics laboratory on any day student chooses

____ Other (please specify)_____

19. Does the student set his own pace for learning?

_____ Yes, entirely up to the student

_____ Yes, with certain constraints imposed by the program

_____ No

20. From the instructional methods listed below choose those that best describe your DMC. If you offer more than one DMC with different methods for each course please specify which method corresponds to which course.(Choose no more than four responses)

_____ Lecture Method

_____ Discussion Groups

_____ Emphasis on Audio Visual Aids

_____ Audio Tutorial Method

_____ Team Teaching

_____ Extensive Tutoring

_____ Supplemental Tutoring

_____ Computer Assisted Instruction

_____ Programmed Book Instruction

_____ Keller Plan

_____ Group Work

_____ Work Books or Work Sheets

_____ Open Book Examinations

_____ Small Classes

_____ Individual Attention

_____ Open Laboratories

_____ A comprehensive developmental program for many other areas of instruction as well as mathematics

21. Does your college have any of the following facilities specifically for DMC?

_____ Movies

_____ Slides

_____ Audio Tapes

_____ Electronic Calculators for use in DMC

_____ Mathematical Gadgets (please specify)_____

_____ Mathematical Games (please specify)_____

_____ Computer for use in DMC

_____ Specific Library for DMC

_____ Laboratories for DMC

22. What type of grades are given in the DMC? Note: If different types of grades are given for different DMC or for different students then please specify that information to the right of each appropriate response.

_____ Letter

_____ Numerical

_____ Pass-Fail

_____ Incomplete

_____ Pass-No Credit

_____ Pass-Partial Credit

_____ Some variation of Pass-Incomplete

_____ Student's Choice

_____ Written Statements

23. Is there credit given for DMC? If this depends on student major and/or particular DMC then please specify restrictions to the right of the appropriate responses.

_____Yes, but not to meet mathematics degree requirement

_____Yes

_____No

24. If you use commercially available texts, workbooks or programmed books, please give the title(s) and author(s). (Please specify for each course)

_____

_____

25. If you use instructional material unique to your college please give a brief description.

_____

_____

E. Personnel Questions:

Directions: Please check the appropriate responses.

26. How are instructors assigned to DMC?

_____ Instructors are hired specifically for DMC

_____ Instructors volunteer

_____ Instructors rotate

_____ Instructors are assigned

27. What is the approximate faculty/student ratio for DMC?

_____ Between 1-1 and 1-5
_____ Between 1-5 and 1-10
_____ Between 1-10 and 1-20
_____ Between 1-20 and 1-30
_____ Between 1-30 and 1-40
_____ Between 1-40 and 1-50
_____ Over 1-50

28. Do you specifically assign any para-professionals or secretaries to assist instructors with the record keeping involved with DMC?

_____ Yes
_____ No

29. Do you hire tutors to assist instructors?

_____ Yes, two year college students
_____ Yes, four year college students
_____ Yes, graduate students
_____ Yes, (specify)
_____ No

30. If the DMC is administered by the Mathematics Department, is one person, other than the department chairman, in charge of the program?

_____ Yes
_____ No

31. If your response to question 30 is yes, then is this person given release time?

_____ Yes
_____ No

32. Are there counselors available for students enrolled in DMC?

_____ Yes, there are counselors specifically for students enrolled in DMC
_____ Yes, we may refer students to college counselors
_____ Yes, but only for placement
_____ No

F. Evaluation Question:

Directions: Please check the appropriate response(s).

33. Approximately what percentage of the students enrolled in DMC go on to other college mathematics courses?

_____ 80-100%
_____ 60-80%
_____ 40-60%
_____ 20-40%
_____ 0-20%
_____ I do not know

34. What percentage of the students enrolled in DMC successfully complete their next college mathematics course?

_____ 80-100%
_____ 60-80%
_____ 40-60%
_____ 20-40%
_____ 0-20%
_____ I do not know

35. What percentage of the students who enrolled in DMC have gone on to complete the first two years of college?

_____ 80-100%
_____ 60-80%
_____ 40-60%
_____ 20-40%
_____ 0-20%
_____ I do not know

36. Which of the following do you believe are the greatest strengths of your DMC? (Check no more than three responses)

_____ Concern for students
_____ Small Class Size
_____ Programmed material
_____ Student self paced
_____ Peer Tutoring
_____ Giving credit for DMC
_____ Testing only for mastery learning
_____ Students are not isolated in special classes
_____ Modula System
_____ Other (please specify)_____

37. Many schools presently have teacher and course student evaluations. However, very few DMC have been formally evaluated by research techniques. Has there ever been any formal evaluation of your DMC? (If such an evaluation is available, please attach. If it is published please indicate where).

_____ Yes
_____ No

38. Are you satisfied with your DMC?

_____ Yes

_____ No, but it should be improved

_____ No and it should be dropped as a course offering

_____ Undecided

39. How would you improve your DMC?

_____

_____

_____

_____

40. If you have any additional comments regarding your DMC, please state them here.

CODE NUMBER	NAME & ADDRESS
1	Ping Tung Chang Gordon Jr. College Barnesville, GA 30204
2	A.G. Besserman Kishwankee College Ma Ha, ILL 60150
3	James T. Walker North Florida Jr. College Madison, FLA 32340
4	Don Harris Centralia College Centralia, WA 98531
5	Rudy Maglio Oakton Community College Morton Grove, ILL 60053
6	Sister Clarice Sparkman San Jose City College San Jose, CAL
7	Catherine Standerfer Tarrant County Jr. College South Campus Fort Worth, TX 76119
8	Amy Pohl Prince George Community College Largo, MD 20870
9	Juliana Corn Queensborough Community College Queens, NY 11375
10	Loren W. Pixleg Community College of Decatur Decatur, ILL 62523
11	M. Foulke Jefferson Community College Louisville, KY 40201

CODE NUMBER	NAME & ADDRESS
12	Eliz Otten Southwestern Jr. College Chula Vista, CA 92139
13	Edward Curtis Maysville Community College Maysville, KY 41056
14	John W. Milson Butler County Community College Butler, PA 16001
15	Dr. David Conroy Northwestern Virginia Community Coll. Annadale, VIR 22003
16	Herbert L. Hooper, Jr. Chattanooga State Tech Community Coll Chattanooga, TENN 37406
17	Robert Carson Hagerstown Jr. College Hagerstown, MD 21740
18	Maurice E. Nott, Jr. St. Petersburg Jr. College St. Petersburg, FLA
19	Ed Bouse Community College of Denver North Campus Denver, COL
20	John B. Davenport Dutchess Community College Poughkeepsie, NY
21	Josephine Story Chipola Jr. College Marianna, FLA
22	Joe Cockram Wytheville Community College Wytheville, VIR
23	Arthur P. Dull Los Medanos College Pittsburg, CAL

CODE NUMBER	NAME & ADDRESS
24	Edward Turner Ohio College of Applied Science University of Cincinnati Cincinnati, OH
25	Etta Mae Whitton Tallahassee Community College Tallahassee, FLA
26	R.J. Debelak East Los Angelos College Los Angelos, CAL
27	Darryl G. Walke Somerset County College Somerville, NJ
28	Dr. William D. Serbyn College of St. Thomas St. Paul, MINN
29	Sister M. Alicia Maria Regina College Syracuse, NY
30	Robert B. Sackett & R.E. Jones Erie Community College North Campus Buffalo, NY
31	Florence D. Jacobson Albertus Magnus College New Haven, CONN
32	Karen Bowyer Shelby State Community College Memphis, TENN
33	David W. Spencer Highland Community College Freeport, ILL
34	Richard S. Hyman Everett Community College Everett, Washington
35	Dean Buzzard C.S. Mott Community College Flint, MICH

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36	Leonard Wapner El Camino College El Camino, CAL
37	Michael Colchiski Central Florida Community College Ocala, FLA 32670
38	David H. Buckley Polk Community College Winter Haven, FLA 33880
39	Keith Williams Miami - Dede Community College North Campus Miami, FLA
40	Robert Leeper Indiana Vocational Technical College Fort Wayne, IND 46741
41	Joseph K. Bryant Monterey Peninsula Monterey, CAL 93940
42	William Setek Monroe Community College Rochester, NY 14623
43	Geoffrey Akst Manhattan Community College New York, NY 10020
44	LeRoy Johnson Big Bend Community College Moses Lake, Washington 98837
45	Miriam Hecht Hunter College New York, NY 10021
46	Michael F. Suhadolnik Lincoln Land Community College Springfield, ILL 62708
47	Vincent A. Zalapi College of Lake County Grayslake, ILL 60030

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51	Shirley Beller Burlington County College Pemberton, NJ 08068
52	Allen C. Utterback Cabrillo College Aptos, CAL 95003
53	James H. McAllister Lewis & Clark Community College Godfrey, ILL 62035
54	Vincent R. Aleksey Grays Harbor College Aberdeen, Washington
55	Mary McCarty Sullivan County Community College Loch Sheldrake, NY
56	Patricia Dyer Broward Community College Fort Lauderdale, FLA
57	Dr. Donald M. Hill Florida A. & M. University Tallahassee, FLA
58	Sr. Lorraine Veldenz Ancilla College Donaldson, IND
59	Gerald M. Smith Auburn Community College Auburn, NY

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61	Dale L. Croft Westmoreland County Community College Youngwood, PA
62	Wei-Jen Luan American River College Sacramento, CAL
63	Eleanor S. Young Sinclair Community College Dayton, OH
64	Elmer Mattila Metropolitan Community College Minneapolis, MINN
65	Jack R. McDonald Monroe County Community College Monroe, MICH
66	Eric M. Lederer C.C. of Denver (RED Rocks) Golden, COL
67	George A. Simmons Lorain County Community College Elyria, Ohio
68	Judith F. Kneen Montgomery College (Rockville) Rockville, MD
69	Thomas Kerkes North Central Tech. Institute Wausau, WISC
70	Dr. Allen N. Sheppard Fort Valley State College Fort Valley, GA
71	Dr. Henry W. Rejent Tidewater Community College Frederick Campus Portsmouth, VA 23703

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73	John F. Haldi Spokane Community College Spokane, WA 99203
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75	Amy G. West Berkshire Community College Pillsfield, MASS 01201
76	Joy Felt Moraine Valley Community College 10900 South 88th Avenue Polos Hills, ILL 60465
77	M.G. Bordelon College of the Mainland Texas City, TX 77590
78	Richard Compton Wright City College Chicago, ILL 60634
79	Richard Meyers Joilet Jr. College Joilet, ILL 60436
80	Dr. Mary Leach UMBC - University of Ma-Baltimore County Baltimore, MD 21228
81	C.A. Powers Lansing Community College Lansing, MICH 48914
82	Robert McConnell Union College Cramford, NJ 07016

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86	A. Maurice Crawford Merced College Merced, CA 95340
87	Joan Taylor Parkland College Champaign, ILL 61820
88	George Cocks Northampton City Area Community Coll Bethlehem, PA 18017
89	Elaine S. Johnson Jamestown Community College Jamestown, NY
90	Allan Christenson MATC Milwankee, WIS 53051
91	Gerald E. Bruce Riottondo College Whittier, CAL 90608
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93	Michael G. Helinger Clinton Community College Plattaburgh, NY 12901
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96	Amy J. Fecci Somerset County College Somerset, NJ
97	Joan C. Prymas Hirkimer County Community College
98	Anthony J. Schaeffer Indiana University Southeast New Albany, IND
99	Alan C. Hedgespeth Henderson Community College Henderson, KY
100	Mrs. Ruth W. Wing Palm Beach Jr. College Lake Worth, FLA
101	Dr. Joseph Cicerro Clayton Jr. College Morrow, GA
102	M. Inez Everest S. Central Community College New Haven, CONN
103	Thomas Ribley Valencia Community College Orlando, FLA
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List of Members of
Developmental Mathematics Committee

Name	College
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